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ABSTRACT

This paper discusses attitudes toward technical-writing courses, presenting four reasons that some people view those courses with disdain and demonstrating why those reasons are inappropriate. These attitudes reflect disdain for what many people take to be the dull, unimaginative, nonhumanistic nature of the subject. In refutation, the paper emphasizes the humanistic aspects of technical writing, showing how technical writing skills can be useful and how they can affect human lives. (RL)

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THE ENGLISH TEACHER IN A COLLEGE OF ENGINEERING

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Paper ——— presented at the Conference on College Composition and Communication, Kansas City, Missouri, 1 April 1977.

How do people look at a teacher of technical writing in a college of engineering? This is really an impossible question to answer accurately. There are 454 engineering college, technical college, and affiliated technical institute members of the American Society of Engineering Education. Moreover, these colleges differ markedly in character. Some of them, like M.I.T. and Cal. Tech., are self-sufficient entities with their own special English or Humanities departments. Others, like the Colleges of Engineering at the Universities of Illinois, Wisconsin, or Ohio State, are parts of large universities in which there is a sizeable graduate-level English department providing service courses to the college of engineering. Only at the Universities of Virginia, Washington, and Michigan are there separate Humanities Departments serving the College of Engineering while the English Department serves the rest of the campus. My own Humanities Department at Michigan is even distinctive in our university. It is the one and only purely service department on the Ann Arbor campus--a department with no students to call its own--in a university with 33,000 students, 17 different schools and colleges, and 155 different graduate degree programs.

There has been no national survey of all these diverse engineering institutions to find out what their attitudes are toward teachers of technical writing. But there has been a study made of a sample of 284, out of a total of 1526, college

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English departments throughout the country. This is Tom Wilcox's book, The Anatomy of College English, published in 1973. Unfortunately only one lone paragraph in this 180 page book is devoted to technical writing. In it Wilcox says, "Members of the department who teach in these programs are often an embattled band who see themselves slighted and their courses depreciated by their literary colleagues."

So, without any evidence at all of what engineering colleges in general feel, and with only one paragraph of evidence about how English departments in general feel about technical writing, the best that I can do is to give you my impressions, and these are based upon very limited experience.

Let me start with my own department, then enlarge the focus to examine my own college, then my university, and finally society at large.

Despite the fact that we are the sole service department in the University of Michigan--Ann Arbor, the faculty of my department are definitely considered first-class academic citizens by our colleagues. Two members of my department have served as Chairman of the Engineering College Curriculum Committee which must approve every change of course or graduation requirement for all of the technical degree programs in the college. Two other people in my department have been elected by the engineering faculty to the College Executive Committee which advises the Dean on all matters of budget allocation, appointment, and promotion. Four others have been elected to represent the engineering faculty in the university-wide Senate Assembly, and two of these people have been elected by the members of the Assembly to the prestigious Senate Advisory Committee on University Affairs, the nine faculty members who represent the entire faculty of the University in advising the President and the Regents on all matters affecting the University.

But our staff consists of teachers of history, philosophy, and literature, as well as teachers of writing, and the offices I have just listed have been pretty evenly divided between literature specialists and writing specialists. Of our professorial

staff of 24, only 10 teach writing, and one of these, Bob Martin, teaches creative, rather than "technical" writing. You might be interested to know that Bob recently persuaded the Hopwood Committee of the English Department across the campus to open the nationally known Hopwood Creative Writing Contest to engineering students as well as students enrolled in English classes. Within a year one of Bob's engineers walked off with a major award for drama.

So 15 professors in my department concentrate on teaching literary subjects and only 9 of us teach technical writing. We are all good friends, but I find it very difficult to interest any of these other 15 people in what I am doing. I sense that they believe that technical writing is a useful and necessary course, especially for engineering students, but that it must be very dull and uninteresting and at the same time difficult to teach, dealing as it does with mathematical equations, gear ratios, and sewage treatment. I think that they feel relieved that the 9 of us are willing to teach the technical writing courses because that means that they won't have to.

In the larger unit of the College there are a fairly large number of the faculty who have a great deal of respect for technical writing. For example, I can normally count on having several engineering faculty members, including department chairmen, attend the final examination lectures my students give in my own technical writing course. But some other engineers regard technical writing as definitely less important than the research they are engaged in. The results must be written up, of course, but that is one of the irritating details that will be postponed as long as possible because the laboratory is far more fascinating than the typewriter. And some other engineers are interested only in teaching their students to solve problems. Here the ability to use the computer terminal is all that matters and you talk to the computer in FORTRAN or ALGOL, not in English.

Within the University as a whole there are also two different attitudes. Some of the science and medical faculty of the other 16 schools and colleges regularly send us students. We are

accustomed to having nurses, pharmacists, geologists, zoologists, dentists, and people in public health enroll in our classes. And two members of the Linguistics Department have testified that our senior-level writing courses might serve as models for the Literary College to study. But most of the humanities faculty across the campus, if they are aware that there are such courses as technical writing at all, have an attitude which may be best expressed by the answer a senior professor from the English Department gave when asked how his departmental colleagues regarded my own. "With disdain," was his reply.

Beyond the environs of the university the same differences of attitude are evident. The public in general really becomes aware of technical writing only when they must make sense of a poorly written instruction manual or an unreadable government report. On the other hand, for 20 years we have been offering a summer course in Written Communication for Engineers, Scientists, and Technical Writers which has drawn as many as 90 participants from all over the United States, Canada, and overseas. And this summer for the third time my colleagues, J. C. Mathes and Dwight Stevenson, will offer their course in Teaching Technical and Professional Writing and for the third time they will probably have to turn people away.

Thus, it is my intuitive impression that there are those who consider technical writing important and respect it, and those who regard it with lack of interest or even disdain.

Surely you do not want me to try to analyze why technical writing is respected by those who do respect it. It is more important to try to analyze why those who disdain it do so.

I perceive at least four reasons why people do not care for technical writing courses.

First, one thing that turns many people away from courses in technical writing is that they seem to concentrate on forms--the report form, the memo form, the form of the business letter, the form of the abstract. I find most of the texts on technical writing are arranged in chapters according to form. To someone brought up in the study of literature, all this sounds constraining and suffocating. Indeed since the Romantics one of the marks

of literary quality has often been the unwillingness to abide by traditional forms, the creativeness to break out, to plant a flag on new territory -- as James Joyce did with his Ulysses. But even literary people will agree that there are some conventions which are useful, which are difficult to violate with impunity.

To change their attitudes toward technical writing it will be necessary to persuade these people that many of the forms used in scientific and technical writing are not only useful but essential. Take the title of a scientific paper or an engineering report. The West Coast Naval Ordnance Laboratories published an interesting pamphlet demonstrating why the wording of such titles is vitally important. The point is that in today's flood of scientific information, the title of a paper may be the only thing that ever appears in journal, so it should explicitly identify the subject treated in the paper and how this subject is treated. Meaningless words, like "A General Introduction to the Principles of . . ." should be ruthlessly pruned out as mere noise; they force the reader to scan seven words before he can determine what the subject of the paper is. Only a precisely worded title will get a paper or report properly indexed and thus into the hands of scientists and engineers who rely upon the subject entries of card catalogues and abstract indices when they search for information.

It is also easy to demonstrate that the abstract is an essential and useful form for similar reasons. However, I would argue that it can be made even more useful if it is always designed as a condensed summary of the paper and further if it is printed on the title page rather than after it. This form, widely used in England, enables one to reproduce and distribute a single page, which contains a great deal of useful information, at very modest cost.

Unfortunately, a number of the textbooks on technical writing give the impression that the author has adopted formalistic conventions uncritically without asking if they serve any useful purpose. This is the way a particular industry requires its information presented; here is the way another one does. Few

of them seem to ask, Why do they do it this way? Perhaps an illustration may make this point clearer. For years our Graduate School Announcement was a bulky book of about 400 pages. It cost in the neighborhood of $100,000 to print each year because it was sent to all applicants for admission so that they would know the general rules and regulations of the Graduate School and details of all the graduate programs. Since there are 155 degree programs and some of them are always in the process of revision, the whole book had to be up-dated and re-printed, first at yearly intervals, later only every two years.

I was asked to study this book and see if I couldn't find a better, cheaper form for it. The first thing that occured to me was, "Is it useful?" It turned out that it was useful only to the Graduate School administration, the handful of people who needed to keep track of <u>all</u> the degree program requirements. An individual applicant interested in the History of Art program wasn't remotely interested in the degree requirements for a Ph.D. in Macromolecular Science or Otorhinolaryngology. Why not simply send him the general rules describing how to get in and stay in the Graduate School and the details of the only program he was interested in?

That is how the Graduate School Announcement is now printed-- a slim little book containing the general rules, and a whole series of separate pamphlets describing individual degree programs. A few copies of the whole thing are bound together simply for the use of the administrators. Since the rules don't change very often, the book doesn't need to be up-dated very often; brochures are simple to revise and reprint, and, moreover, the Graduate School can print only as many copies of each as it thinks it will need.

Thus I think technical writing teachers can make a persuasive case that the forms which so irritate those who dislike technical writing can actually be very useful if carefully thought out.

There is a second reason I think that people trained in

literature are uncomfortable with technical writing. Literary people are accustomed to trying to organize and make sense of the inner world, the world of the mind and of the emotions. Because the human character is marvelously complex and the evidence of it fleeting, character must often be inferred from subtle clues. For this reason the literary author often feels compelled to devote many words and much space to explaining and justifying his interpretation of the evidence. Moreover, much of the most useful factual evidence of character is private rather than public, family letters, diaries, remembered conversations. Such evidence is difficult to find and accumulate. And even when such evidence is found it is likely to be fragmentary and allusive, and inferences drawn from it will also need to be explained and justified at some length.

By contrast the technical writer is normally trying to organize and make sense of the outer world -- the touchable, seeable, countable world. And his task is almost the opposite of the literary writer's. He is faced with a superabundance of evidence -- all of it public, because to paraphrase Aristotle's "Man is by nature a political animal," the scientist by nature is a publishing animal -- and none of it is subtle, for Nature may be complex and inscrutable, but she isn't trying to hide anything. Even man-made devices, systems, and structures are abundantly revealed in public documents like patents, regulatory hearings, and licenses. The technical writer must hack his way through an overgrown jungle of evidence, stripping away the superfluous, chopping off the irrelevant, trying to clear a simple path toward a logical conclusion.

An excerpt from a good piece of technical writing, Michael Crichton's Five Patients, may illustrate the problem. Crichton points out why the computer is beginning to invade the hospital. Every patient has a chart, that clipboard at the foot of the hospital bed, so that the attending nurse and physician can keep track of the patient's progress and treatment. If the patient is severely ill, items of information may be added to the chart every hour, or even oftener: temperature, pulse, blood pressure, respiration, medication administered, diagnostic tests performed, X-rays taken,

and so on ad infinitum. Crichton points out that in the case of a burn patient it is vital to keep track of the patient's fluid balance. But how can one extract this information from all of the items on the patient's chart? He reprints a computer print-out to show how it is done:

> Here the computer is summarizing intravenous ... and oral fluid intake, urine output, and weight change over a 5-day period. This achievement will not be very exciting to anyone who has not spent half an hour going through a patient's chart attempting to extract this information -- which the computer can provide in milliseconds.

We can use Crichton's illustration in another sense and point to the problem that a technical writer faces in describing the principles of a computer program to someone -- say a physician -- who may be interested in using it. The trouble is that a computer program is <u>all</u> details, millions of them, and it is exceedingly difficult to compress and reduce them to chunks of information which can be mentally digested. One computer report I helped write runs to 131 pages. But 114 of these pages are appendices containing the detailed instructions the computer needs in order to function. The text of the report, the compressed essence the human being needs in order to understand what the computer will do as a result of these instructions, is contained in just 17 pages at the beginning of the manuscript.

Thus, technical writing, because it is factual, probably seems roughly equivalent to the "library research" paper often assigned to freshman composition students who have had no training at all in the use of library resources and are thus forced to rely heavily on the few sources they could locate. Or perhaps it seems similar to the research involved in preparing a doctoral dissertation in English, which I gather -- since my own degree was in another field -- is sometimes a prolonged and rather frustrating experience.

I think that the people who dislike the course must be persuaded that technical writing is much easier to teach than freshman composition (and perhaps literary analysis) because <u>invention</u> is less of a problem, because the student has a great deal of

obvious information available to him, and because it is much more interesting to show a student how to edit down too much information than it is to plead with a student to accumulate sufficient information.

Third, I think that the very title "technical writing" tends to both frighten and mislead those people who dislike it. It frightens them because the word "technical" suggests that the teacher must deal primarily with mathematics and machines, and very complicated mathematics and very dull machines. The title misleads them because technical writing need involve no mathematics at all, or at most only an equation or two designed to elucidate a concept already expressed in words. Calculations properly belong in appendices. Moreover, technical writing normally involves a perfectly understandable and interesting human problem which may perhaps be solved with the use of a mechanical device, a chemical compound, or an electronic circuit.

It may not be easy to persuade people of this. And the technical writing texts on my shelf, even the ones I admire most, are of little help because the examples they provide normally fail to suggest that any human beings are involved. Oh, there are usually examples of letters or memos addressed to people, but the examples of reports are almost always limited entirely to discussions of machines or other "things".

It seems to me imperative to ask, Who cares? And Why? If I fail to require my students to answer these questions clearly and explicitly, I will never be able to convince others that technical writing is worthwhile.

For example, who cares that someone has designed a circuit to send a trigger pulse when voltages from a thermocouple and a milliammeter both reach prescribed values simultaneously? The X-ray technician in a hospital cares, especially when he is faced with an infant patient. In order to get a good image he must shoot his picture when the lungs are expanded and so is the heart. But you can't ask an infant to take a deep breath and hold it. And you can't ask any patient to control his heart beat. But one

of my engineering students solved the problem. His simple electronic circuit automatically triggered the X-ray when a thermocouple placed at the infant's nostrils indicated it had drawn in a breath of cool air and at the same time electrocardiogram electrodes attached to the child's wrist and earlobe indicated that the infant's heart was fully expanded.

Who cares that an array of tiltmeters may be used to detect anomalous tilts along geologic faults? Californians care. Anomalous, or sudden, tilts in the rock strata near a fault like the San Andreas often occur before major earthquakes. One of my geology students thinks he can predict earthquakes along this fault by establishing a network of tiltmeters -- sort of carpenter's bubble levels with electrodes to transmit telegraphic signals when the bubbles move. When a bunch of these bubbles all shift a little bit, Californians better start packing -- an earthquake is due shortly.

Even if it is possible to persuade people that technical writing deals with human problems, there is a fourth and final obstacle to be overcome. Many people in the academic world, like Plato in The Republic, look down their noses at the practical arts and wish to have little to do with them. This attitude is described by the Duke of Edinburgh in an article in The Manchester Guardian Weekly for the week ending 25 July 1976. The Duke says in part:

> Engineering, except for that short period in the middle of the nineteenth century, has been looked upon as a second-class intellectual activity not really fit to be compared with the arts, classics, finance or even science. I suspect that the trouble is that the discipline of engineering is absolute. It either works or it does not....
>
> It is always possible to find arguments and excuses for disastrous administrative and economic decisions. There are so many factors and variables and the final responsibility is so well camouflaged that the most ardent and objective investigator is never able to pin the blame on anyone.

> If there is an engineering disaster, it is there for all to see and in the end some poor engineer will be found to have stuck his neck out too far. He cannot use the excuses that the opposition had done it before or that his idea was sanctioned by the party headquarters or that it followed the principles laid down by someone writing 120 years ago.
>
> It is this uncompromising aspect of engineering which seems to make it so inferior in the eyes of those who delight in battles of wits and theory rather than in battles of facts and creation.

How can I, how can we, persuade people who believe that engineering is inherently inferior or that science is inhuman or a force to be feared? It may be impossible. It may be that this is a contest of religious faiths. As Jacques Monod puts it in Chance and Necessity:

> The gravest danger mankind faces is the evolution of ideas. One simple idea is at the root of it -- that nature is objective, experience is the sole source of true knowledge.
>
> The idea that objective knowledge is the sole source of truth imposes an ascetic renunciation of all other soothing spiritual fare. But science -- with its puritan arrogance -- has conquered its place in society in man's practice if not in man's heart.

To conclude, I get the impression that there are at least two opposing points of view towards technical writing courses and those who teach them: one favorable, one disdainful. The reasons for this disdain are, I think, fourfold. Some people have the impression that technical writing: (1) imposes restrictive and arbitrary forms upon the creative individual, (2) involves the painful or pedestrian and unimaginative accumulation of factual evidence, (3) deals only with things instead of people, and (4) is, like the other practical arts, a second-class activity.

The first three of these reasons can be demonstrated to be

mistaken. The last is more difficult to deal with. However, if science, and its partner, engineering, have indeed conquered a place in society both in man's thought and in his practice -- as I think they have -- then it may be argued that the dissemination of scientific and technical information through technical writing may do more to influence men's actions than the writing of books and articles on the more literary subjects of the arts, classics, or finance.. It might even be argued that technical writing is just as humanistic -- and thus presumably as worthy of respect by those concerned with the human condition -- as artistic writing because it tells man what he wants to know and needs to know in order to survive.